

Project Summary
For a Construction Permit Application:

New CFB Boiler and Associated Equipment
To Replace 5 Existing Boilers

Project to be located at:

Corn Products Argo Plant
Bedford Park, Illinois

Site Identification No.: 0310212ABI

Application No.: 03090020

Date Received: September 8, 2003

Schedule

Public Comment Period Begins: 01/17/2004

Public Hearing: 03/03/2004

Public Comment Period Closes: 04/02/2004

Illinois EPA Contacts

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I. INTRODUCTION

Corn Products International, Inc. has requested a permit to construct a new circulating fluidized bed (CFB) boiler at its Argo Plant, located at 6400 Archer Road, in Bedford Park, Illinois. The new boiler will replace five existing boilers (three coal fired boilers and two natural gas fired boilers).

The Illinois EPA has prepared a draft of the construction permit it proposes to issue to authorize the construction of the CFB boiler and supporting equipment. The permit identifies the applicable rules governing emissions from the CFB boiler, and establishes enforceable limitations on its emissions. The permit also establishes appropriate compliance procedures, including requirements for emissions testing, continuous emissions monitoring, record-keeping, and reporting. The Permittee will be required to carry out these procedures on an ongoing basis to demonstrate that the CFB boiler is operating within the limitations established by the permit and that emissions are being properly controlled. The Illinois EPA has also prepared a draft Budget Permit for the proposed plant, to address requirements under the state's NO_x Trading program.

II. PROJECT DESCRIPTION

The project includes the installation of a new CFB boiler; associated equipment for handling and storing solid fuel, ash, limestone, lime, dilute ammonia/urea; a small cooling tower; and other ancillary operations. The new CFB boiler is nominally rated 1,670 MM BTU per hour. Five existing boilers will be shut down after the new CFB boiler has completed shakedown testing and demonstrated reliability.

The CFB boiler will be fired on coal as the primary fuel, with natural gas as the supporting fuel. Petroleum coke ("petcoke") and biofuels such as: corn kernels, cobs and cleanings, grain fibers or hulls, grain germ oat hulls, nut shells or similar materials, may be used as supplemental fuels, with natural gas used as a startup fuel.

In a CFB boiler, fuel is burned in a suspended bed with air forced upwards through the bed from the bottom. This technology provides certain inherent benefits for reducing emissions.

First, fluidized bed combustion occurs at a relatively low temperature, which reduces the formation of nitrogen oxides (NO_x). Air is introduced into the boiler at multiple levels, both as fluidizing air under the furnace and as secondary air added directly into the furnace, which stages combustion. This method of combustion further avoids conditions that favor the formation of NO_x. The high degree of mixing in the bed provides uniform temperatures throughout the bed and residence time to help control or minimize the formation of CO and VOM.

A second inherent advantage to the CFB boiler is the addition of limestone into the bed to absorb sulfur dioxide. In the bed, the

limestone is calcined into lime which actively reacts with sulfur dioxide (SO₂), reducing SO₂ emissions.

The potential emissions from the boiler will be further controlled by use of a selective noncatalytic reduction (SNCR) system to control NO_x, and a fabric filter (baghouse) to control particulate. A dry lime addition system will be provided to remove acid gasses such as HCl.

Bed ash and fly ash from the CFB boilers will be conveyed to an ash silo. Solid fuel will be transferred by conveyors at the solid fuel handling facilities. Limestone will be crushed and then transferred by conveyors to a limestone silo. Lime will be handled in similar systems.

III. PROJECT EMISSIONS

Overall, the proposed project will generate a significant reduction in emissions, achieved when the new boiler replaces the existing older units currently operated at the plant, which will be permanently shut down after the CFB boiler has completed its shakedown and is fully operational. The net change in emissions associated with replacing five existing boilers with the new boiler are presented below.

<u>Pollutant</u>	<u>Change In Emissions (Tons Per Year)</u>
Particulate Matter (PM)	-399
Sulfur Dioxide (SO ₂)	-7,634
Nitrogen Oxides (NO _x)	-2,352
Carbon Monoxide (CO)	994
Volatile Organic Material (VOM)	20.6
Fluorides	2.4
Sulfuric Acid Mist	3.0

The potential emissions associated with the proposed new boiler are listed below. Potential emissions are calculated based on continuous operation at the maximum load. Actual emissions will be less, to the extent that the plant does not operate year-round and at its maximum capacity.

<u>Pollutant</u>	<u>New CFB Boiler Potential Emission (Tons Per Year)</u>
Particulate Matter (PM)	355
Sulfur Dioxide (SO ₂)	2,129
Nitrogen Oxides (NO _x)	1,064
Carbon Monoxide (CO)	1,064
Volatile Organic Material (VOM)	28
Fluorides	27
Sulfuric Acid Mist	113.5
Lead	0.57

Additional particulate matter will also be emitted from ancillary operations in support of the CFB boiler. These include the storage and handling of coal, ash and limestone and certain bulk material preparation operations. These ancillary operations will emit about 40.5 tons of particulate per year.

IV. APPLICABLE EMISSION STANDARDS

All emission sources in Illinois must comply with Illinois Pollution Control Board emission standards. The various emission units subject to this proposed permit should readily comply with applicable Board standards.

The CFB boiler is subject to the federal New Source Performance Standards (NSPS), 40 CFR 60 Subpart Db, for Industrial-Commercial Steam Generating Units. The Illinois EPA is administering the NSPS in Illinois on behalf of the United States EPA under a delegation agreement. The NSPS sets emission limits for nitrogen oxides, sulfur dioxide and particulate matter emissions from the boiler. Requirements for testing, continuous emissions monitoring, record keeping, and reporting are also specified. Certain other supporting units are also subject to other NSPS.

V. OTHER APPLICABLE REGULATIONS

A. Prevention of Significant Deterioration (PSD)

The proposed CFB boiler is a major source under the PSD rules. For each PSD-regulated air pollutant except CO, the project will not involve a significant net emission increase (Note that HF is a HAP that is not treated as a fluoride under PSD). Thus the project is subject to PSD review for CO.

B. Major Stationary Sources Construction and Modification (MSSCAM)

The proposed CFB boiler is not a major modification under the state rules for Major Stationary Source Construction and Modification (MSSCAM), 35 IAC Part 203. As a result of shutdown of existing equipment, the net change in VOM and PM/PM₁₀ emissions are such that nonattainment new source review will not be triggered. In addition, for VOM, the project relies upon a contemporaneous decrease in VOM emissions of 4.96 tons/year from a recent process change in the vegetable oil refinery (Construction Permit 02040007).

C. Maximum Achievable Control Technology (MACT)

The proposed project is a major source for emissions of hazardous air pollutants (HAP). The potential HAP emissions from the project will be greater than 10 tons of an individual HAP, i.e., hydrogen chloride. Therefore, the project is subject to review under Section 112(g) of the Clean Air Act. The determination of whether the project is major is made without consideration of the emissions decreases from the shutdown of existing boilers.

For this purpose, the Illinois EPA has determined that the

appropriate limits for the CFB boiler are those proposed by USEPA, i.e., the National Emission Standards for Hazardous Air Pollutants for Industrial Commercial-/Institutional Boilers and Process Heaters as proposed at (FR Vol. 68, No. 8, pp. 1659-1763) and all applicable general provisions of 40 CFR 63.1-15. The proposed limits for new large solid fuel-fired boilers, as contained in the permit, are as follows. These limits address boilers that burn coal as well as other solid fuels.

PM	0.026 lb/million Btu
HCl	0.02 lb/million Btu
Mercury	0.000003 lb/million Btu
CO	400 ppm @ 3% O ₂ , 24-hour ave

D. Emissions Reduction Market System (ERMS)

The ERMS is a "cap and trade" market system for major stationary sources located in the Chicago ozone nonattainment area. It is designed to reduce VOM emissions from stationary sources to contribute to reasonable further progress towards attainment, as required by Section 182(c) of the CAA.

This facility is a "participating source" for purposes of the ERMS, 35 IAC Part 205, since it is a CAAPP source with seasonal VOM emissions over 10 tons per season and would be required to hold allotment trading units (ATU) for the VOM emissions of the new boiler.

F. NO_x Trading Program

The NO_x Trading Program is a regional "cap and trade" market system for large sources of NO_x emissions in the eastern United States, including Illinois. It is designed to reduce NO_x emissions to help contribute to attainment and maintenance of the ozone ambient air quality standard in the multi-state region covered by the program, as required by Section 126 of the Clean Air Act.

The CFB boiler would qualify as an affected new non-Electrical Generating Unit (non-EGU) for purposes of 35 IAC Part 217, Subpart U. As an affected non-EGU, the Permittee would have to hold NO_x allowances for the NO_x emissions of the boiler during each seasonal control period. Another requirement of the NO_x Trading Program is to operate pursuant to a Budget permit. The Illinois EPA is proposing to issue the initial Budget permit for the CFB boiler in conjunction with issuance of the construction permit.

G. Clean Air Act Permit Program (CAAPP)

Corn Products International, Inc. (Argo Plant) is considered a major source under Illinois' Clean Air Act Permit Program (CAAPP) pursuant to Title V of the Clean Air Act and currently operates under an issued CAAPP permit. Upon the successful completion of emission testing demonstrating compliance, the source may continue to operate the new boiler and associated equipment

covered by this permit until the Illinois EPA takes final action to modify the sources' existing CAAPP permit to include the new boiler and associated equipment covered under this permit.

VI. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Under the PSD rules, the Permittee must demonstrate that Best Available Control Technology (BACT) will be used to control emissions of CO from the proposed new boiler. Corn Products International has provided a detailed BACT demonstration in its application.

Good combustion practices are concluded to be BACT for control of CO emissions from the CFB boiler, as summarized below. Add-on control devices are not used to control CO emissions from coal-fired boilers.

Pollutant	Emission Limit	Control Measures
CO	0.15 Lb/Million Btu or 250.5 Lbs/Hour - 24-Hour Block Average	CFB Boiler Technology and Good Combustion Practices

VII. AIR QUALITY ANALYSIS

A. Introduction

The United States EPA has established standards, which set limits on the level of pollution in the ambient air. These ambient air quality standards are based on a broad collection of scientific data to define ambient concentrations where adverse human health impacts and welfare impacts may occur. Based upon the nature and effects of a pollutant, appropriate numerical limitation(s) called air quality standards are set to protect against adverse impacts.

Compliance with air quality standards are most often determined by modeling. Modeling is performed by computer, allowing detailed estimates to be made of air quality impacts from a proposed project, over a range of widely differing weather conditions. Modeling techniques are well developed for pollutants like CO, and can readily address the impact of individual sources.

B. Air Quality Analysis Results for the Proposed Project

An air quality analysis was conducted to assess the impact of the project's CO emissions on ambient air quality. Under the PSD rules, this analysis must determine whether the proposed project will cause or contribute to a violation of any applicable air

quality standard. The analysis performed conforms to the guidance and requirements of the United States EPA and the Illinois EPA.

A PSD modeling analysis determined that the air quality impacts of a proposed project do not exceed the PSD Significant Impact Levels (SIL) for CO for any applicable averaging period. Therefore, no further modeling is required. The results of the modeling of the proposed CFB boiler are provided below (units in ug/m³):

Pollutant	Averaging Period	Maximum Impact*	Significant Impact Level (SIL)	National Ambient Air Quality Standard (NAAQS)
CO	1-Hour	258	2,000	40,000
	8-Hour	131	500	10,000

*Represents worst case impact for normal operations, worst case associated with unit startup are 398 and 156 respectively.

C. Other Impacts

As the air quality levels for CO are well below the SIL as shown above, there will not be a significant effect on soils, vegetation or visibility.

VIII. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that the proposed permit meets all applicable state and federal air pollution control requirements, subject to the conditions proposed in the draft permit.

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